WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY LETTER OF PATENT OF THE UNITED STATES OF AMERICA IS:

1. A catalyst composition for vapor phase ammoxidation of alkanes and olefins comprising a compound of the formula:

$$VSb_aM_bO_x$$

wherein V is vanadium, Sb is antimony, M is at least one element selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium, a is from 0.5 to 20, b is 2 to 50 and x is determined by the valence requirements of the other elements present and
wherein vanadium and antimony are isolated in a matrix of the oxides of M.

2. The catalyst composition of Claim 1 wherein M is one element selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium.

3. The catalyst composition of Claim 1 wherein the formula is

$$VSb_aM_bM'_{b'}O_x$$

wherein M and M′ are each one element selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium, M and M′ are different and b′ is 0 to 50.

4. The catalyst composition of Claim 3 wherein M is aluminum and M′ is niobium or magnesium.

5. The catalyst composition of Claim 3 wherein M is zirconium and M' is niobium or magnesium.

6. The catalyst composition of Claim 1 wherein the formula is

$$VSb_aM_bQ_cO_x$$

wherein Q is at least one element selected from the group consisting of rhenium, tungsten, molybdenum, tantalum, manganese, phosphorus, cerium, tin, boron, scandium, bismuth, gallium, indium, iron, chromium, lanthanum, yttrium, zinc, cobalt, nickel, cadmium, copper, strontium, barium, calcium, silver, potassium, sodium and cesium and c is 0 to 10.

7. The catalyst composition of Claim 6 wherein M is aluminum and Q is potassium, calcium, strontium, barium, boron, scandium, phosphorus, yttrium, zinc, tungsten, copper, manganese, molybdenum, cerium, tantalum, rhenium, gallium, indium, tin, iron, cobalt, nickel, cadmium or bismuth.

8. The catalyst composition of Claim 6 wherein M is zirconium and Q is phosphorus, yttrium, lanthanum, tungsten, molybdenum, cerium, bismuth, sodium, manganese, gallium, chromium, zinc or silver.

9. The catalyst composition of Claim 6 wherein M is magnesium and Q is tungsten.

10. The catalyst composition of Claim 1 wherein the formula is

$$VSb_aM_bQ_cQ'_{c'}O_x$$

wherein Q and Q' are each one element selected from the group consisting of rhenium, tungsten, molybdenum, tantalum, manganese, phosphorus, cerium, tin, boron, scandium, bismuth, gallium, indium, iron, chromium, lanthanum, yttrium, zinc, cobalt, nickel, cadmium, copper, strontium, barium, calcium, silver, potassium, sodium and cesium and c' is 0 to 10.

11. The catalyst composition of Claim 10 wherein M is aluminum, Q is tungsten and Q' is one element selected from the group consisting of boron, indium, yttrium, scandium, bismuth and tantalum.

12. The catalyst composition of Claim 10 wherein M is magnesium and Q is tungsten and Q' is one element selected from the group consisting of sodium, chromium, iron, gallium and bismuth.

13. The catalyst composition of Claim 1 wherein vanadium, antimony and M are coprecipitated.

14. The catalyst composition of Claim 3 wherein vanadium, antimony, M and M' are coprecipitated.

15. The catalyst composition of Claim 6 wherein vanadium, antimony, M and Q are coprecipitated.

16. The catalyst composition of Claim 6 wherein vanadium, antimony and M are coprecipitated and Q is impregnated.

17. The catalyst composition of Claim 10 wherein vanadium, antimony and M are coprecipitated and Q and Q' are impregnated.

18. A process of making a catalyst composition for vapor phase ammoxidation of alkanes and olefins comprising:

a) forming a solution of a vanadium compound, an antimony compound and at least one compound of M wherein M is selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium;

b) adding and mixing a base with the solution;

c) coprecipitating hydroxides of vanadium, antimony and M;

d) separating the coprecipitated hydroxide solid from solution;

e) drying the hydroxide solid; and

f) calcining the hydroxide solid to form a catalyst of the formula:

$$VSb_aM_bO_x$$

wherein a is from 0.5 to 20, b is 2 to 50 and x is determined by the valence requirements of the other elements present.

19. The process of Claim 18 wherein the solution is formed by:

a) preparing a separate solution of the vanadium compound, a separate solution of the antimony compound and a separate solution of the compound of M; and

b) mixing the separate solutions together.

20. The process of Claim 18 wherein the vanadium compound, the antimony compound and the compound of M is dissolved in water, alcohol or a mixtures thereof.

21. The process of Claim 18 wherein the vanadium compound, the antimony compound and the compound of M is dissolved in acid or alkali.

22. The process of Claim 18 wherein the solution is heated to a temperature of from 50 to 90°C.

23. The process of Claim 18 wherein the vanadium compound is ammonium metavanadate, vanadyl acetylacetonate, vanadyl chloride or vanadium pentafluoride.

24. The process of Claim 18 wherein the antimony compound is an antimony oxide, an antimony halide or an antimony oxyhalide.

25. The process of Claim 24 wherein the antimony compound is antimony oxide, antimony trichloride, antimony pentachloride or antimony oxychloride.

26. The process of Claim 18 wherein the compound of M is a nitrate, chloride, carbonate, oxalate or hydroxide.

27. The process of Claim 18 wherein the base is ammonium hydroxide, ammonium carboxylate, urea or alcohol.

28. The process of Claim 27 wherein the ammonium carboxylate is ammonium acetate, ammonium tartrate or ammonium citrate.

29. The process of Claim 18 wherein the base is added and mixed to obtain and maintain a pH of from 5 to 10.

30. The process of Claim 29 wherein the pH is 8.

31. The process of Claim 18 wherein the precipitated hydroxides are separated from liquid by filtration or evaporation.

32. The process of Claim 18 wherein the hydroxides are dried at atmospheric pressure and a temperature of from 30 to 200°C.

33. The process of Claim 32 wherein the hydroxides are dried at a temperature of from 100 to 150°C.

34. The process of Claim 18 wherein the hydroxides are calcined at a temperature from 600 to 950°C.

35. The process of Claim 18 wherein the hydroxides are calcined at a temperature from 650 to 850°C.

36. The process of Claim 18 wherein the hydroxides are calcined in air.

37. The process of Claim 18 wherein the solution is formed of a vanadium compound, an antimony compound and one compound of M and at least one compound of M' and wherein the catalyst is of the formula:

$VSb_aM_bM'_{b'}O_x$

wherein M and M' are selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium and are different and b' is 0 to 50.

38. The process of Claim 37 wherein the solution is formed by:

a) preparing a separate solution of the vanadium compound, a separate solution of the antimony compound, a separate solution of the compound of M and a separate solution of the compound of M'; and

b) mixing the separate solutions together.

39. The process of Claim 37 wherein the vanadium compound, the antimony compound, the compound of M and the compound of M' is dissolved in water, alcohol or mixtures thereof.

40. The process of Claim 37 wherein the vanadium compound, the antimony compound, the compound of M and the compound of M' is dissolved in acid or alkali.

41. The process of Claim 37 wherein the solution is heated to a temperature of from 50 to 90°C.

42. The process of Claim 37 wherein the vanadium compound is ammonium metavanadate, vanadyl acetylacetonate, vanadyl chloride or vanadium pentafluoride.

43. The process of Claim 37 wherein the antimony compound is an antimony oxide, an antimony halide or an antimony oxyhalide.

44. The process of Claim 43 wherein the antimony compound is antimony oxide, antimony trichloride, antimony pentachloride or antimony oxychloride.

45. The process of Claim 37 wherein the compound of M is a nitrate, chloride, carbonate, oxalate or hydroxide.

46. The process of Claim 37 wherein the compound of M′ is a nitrate, chloride, carbonate, oxalate or hydroxide.

47. The process of Claim 37 wherein the base is ammonium hydroxide, ammonium carboxylate, urea or alcohol.

48. The process of Claim 45 wherein the ammonium carboxylate is ammonium acetate, ammonium tartrate or ammonium citrate.

49. The process of Claim 37 wherein the base is added and mixed to obtain and maintain a pH of from 5 to 10.

50. The process of Claim 49 wherein the pH is 8.

51. The process of Claim 37 wherein the precipitated hydroxides are separated from liquid by filtration or evaporation.

52. The process of Claim 37 wherein the hydroxides are dried at atmospheric pressure and a temperature of from 30 to 200°C.

53. The process of Claim 52 wherein the hydroxides are dried at a temperature of from 100 to 150°C.

54. The process of Claim 37 wherein the hydroxides are calcined at a temperature of from 600 to 950°C.

55. The process of Claim 37 wherein the hydroxides are calcined at a temperature of from 650 to 850°C.

56. The process of Claim 37 wherein the hydroxides are calcined in air.

57. The process of Claim 18 wherein the catalyst additionally comprises a compound of Q which is added and precipitated with the other elements or is impregnated on the solid before or after the calcination step wherein Q is selected from the group consisting of rhenium, tungsten, molybdenum, tantalum, manganese, phosphorus, cerium, tin, boron, scandium, bismuth, gallium, indium, iron, chromium, lanthanum, yttrium, zinc, cobalt, nickel, cadmium, copper, strontium, barium, calcium, silver, potassium, sodium and cesium to form a catalyst of the formula:

$$VSb_aM_bQ_cO_x$$

and wherein c is 0 to 10.

58. The process of Claim 57 wherein the solution is formed by:

a) preparing a separate solution of the vanadium compound, a separate solution of the antimony compound, a separate solution of the compound of M and a separate solution of the compound of Q; and

b) mixing the separate solutions together.

59. The process of Claim 57 wherein the vanadium compound, the antimony compound, the compound of M and the compound of Q is dissolved in water, alcohol or a mixtures thereof.

60. The process of Claim 57 wherein the vanadium compound, the antimony compound, the compound of M and the compound of Q is dissolved in acid or alkali.

61. The process of Claim 57 wherein the solution is heated to a temperature of from 50 to 90°C.

62. The process of Claim 57 wherein the vanadium compound is ammonium metavanadate, vanadyl acetylacetonate, vanadyl chloride or vanadium pentafluoride.

63. The process of Claim 57 wherein the antimony compound is an antimony oxide, an antimony halide or an antimony oxyhalide.

64. The process of Claim 63 wherein the antimony compound is antimony oxide, antimony trichloride, antimony pentachloride or antimony oxychloride.

65. The process of Claim 57 wherein the compound of M is a nitrate, chloride, carbonate, oxalate or hydroxide.

66. The process of Claim 57 wherein the compound of Q is a nitrate, chloride, carbonate, oxalate or hydroxide.

67. The process of Claim 57 wherein the base is ammonium hydroxide, ammonium carboxylate, urea or alcohol.

68. The process of Claim 67 wherein the ammonium carboxylate is ammonium acetate, ammonium tartrate or ammonium citrate.

69. The process of Claim 57 wherein the base is added and mixed to obtain and maintain a pH of from 5 to 10.

70. The process of Claim 69 wherein the base is added and mixed to obtain and maintain a pH of 8.

71. The process of Claim 57 wherein the precipitated hydroxides are separated from liquid by filtration or evaporation.

72. The process of Claim 57 wherein the hydroxides are dried at atmospheric pressure and a temperature of from 30 to 200°C.

73. The process of Claim 72 wherein the hydroxides are dried at a temperature of from 100 to 150°C.

74. The process of Claim 57 wherein the hydroxides are calcined at a temperature of from 600 to 950°C.

75. The process of Claim 57 wherein the hydroxides are calcined at a temperature of from 650 to 850°C.

76. The process of Claim 57 wherein the hydroxides are calcined in air.

77. The process of Claim 57 wherein a compound of Q is impregnated before or after the calcination step.

78. The process of Claim 77 wherein Q is impregnated after the calcination step to form a solid and the process additionally comprises calcining the solid at a temperature from 600 to 950°C.

79. The process of Claim 78 wherein the additional calcination step is at a temperature of below 850°C.

80. The process of Claim 18 wherein the catalyst additionally comprises compounds of Q and Q' which are added and precipitated with the other elements or are impregnated on the solid before or after the calcination step wherein Q and Q' are each selected from the group consisting of rhenium, tungsten, molybdenum, tantalum, manganese, phosphorus, cerium, tin, boron, scandium, bismuth, gallium, indium, iron, chromium, lanthanum, yttrium, zinc, cobalt, nickel, cadmium, copper, strontium, barium, calcium, silver,

potassium, sodium and cesium, to form a catalyst of the formula

$$VSb_aM_bQ_cQ'_{c'}O_x$$

and wherein c and c' are 0 to 10.

81. The process of Claim 80 wherein the solution is formed by:

a) preparing a separate solution of the vanadium compound, a separate solution of the antimony compound, a separate solution of the compound of M, a separate solution of the compound of Q and a separate solution of the compound of Q'; and

b) mixing the separate solutions together.

82. The process of Claim 80 wherein the vanadium compound, the antimony compound, the compound of M, the compound of Q and the compound of Q' is dissolved in water, alcohol or a mixtures thereof.

83. The process of Claim 80 wherein the vanadium compound, the antimony compound, the compound of M and the compound of Q and the compound of Q' is dissolved in acid or alkali.

84. The process of Claim 80 wherein the solution is heated to a temperature of from 50 to 90°C.

85. The process of Claim 80 wherein the vanadium compound is ammonium metavanadate, vanadyl acetylacetonate, vanadyl chloride or vanadium pentafluoride.

86. The process of Claim 80 wherein the antimony compound is an antimony oxide, an antimony halide or an antimony oxyhalide.

87. The process of Claim 80 wherein the antimony compound is antimony oxide, antimony trichloride, antimony pentachloride or antimony oxychloride.

88. The process of Claim 80 wherein the compound of M is a nitrate, chloride, carbonate, oxalate or hydroxide.

89. The process of Claim 80 wherein the compound of Q is a nitrate, chloride, carbonate, oxalate or hydroxide.

90. The process of Claim 80 wherein the compound of Q' is a nitrate, chloride, carbonate, oxalate or hydroxide.

91. The process of Claim 80 wherein the base is ammonium hydroxide, ammonium carboxylate, urea or alcohol.

92. The process of Claim 91 wherein the ammonium carboxylate is ammonium acetate, ammonium tartrate or ammonium citrate.

93. The process of Claim 80 wherein the base is added and mixed to obtain and maintain a pH of from 5 to 10.

94. The process of Claim 93 wherein the base is added and mixed to obtain and maintain a pH of 8.

95. The process of Claim 80 wherein the precipitated hydroxides are separated from liquid by filtration or evaporation.

96. The process of Claim 80 wherein the hydroxides are dried at atmospheric pressure and a temperature of from 30 to 200°C.

97. The process of Claim 96 wherein the hydroxides are dried at a temperature of from 100 to 150°C.

98. The process of Claim 80 wherein the hydroxides are calcined at a temperature of from 600 to 950°C.

99. The process of Claim 80 wherein the hydroxides are calcined at a temperature of from 650 to 850°C.

100. The process of Claim 80 wherein the hydroxides are calcined in air.

101. The process of Claim 80 wherein a compound of Q is impregnated before or after the calcination step.

102. The process of Claim 101 wherein Q is impregnated after the calcination step to form a solid and the process additionally comprises calcining the solid at a temperature from 600 to 950°C.

103. The process of Claim 102 wherein the additional calcination step is at a temperature of below 850°C.

104. The process of Claim 80 wherein compounds of Q and Q' are impregnated before or after the calcination step.

105. The process of Claim 104 wherein the compounds of Q and Q' are impregnated after the calcination step to form a solid and the process additionally comprises calcining the solid at a temperature from 600 to 950°C.

106. The process of Claim 105 wherein the additional calcination step is at a temperature of below 850°C.

107. A process for ammoxidation of alkanes and olefins comprising: contacting a mixture of an alkane or olefin, ammonia and molecular oxygen in the gas phase with a catalyst composition of the formula:

$$VSb_aM_bO_x$$

wherein V is vanadium, Sb is antimony, M is at least one element selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium, a is from 0.5 to 20, b is 2 to 50, and x is determined by the valence requirements of the other elements present.

108. The process of Claim 107 wherein the catalyst is in a fixed bed, fluidized bed or a moving bed.

109. The process of Claim 107 wherein the mole ratio of alkane to ammonia is in the range from 0.5 to 10.

110. The process of Claim 109 wherein the mole ratio of alkane to ammonia is in the range from 1 to 2.5.

111. The process of Claim 107 wherein the mole ratio of alkane to oxygen is in the range from 0.1 to 10.

112. The process of Claim 111 wherein the mole ratio of alkane to oxygen is in the range from 0.5 to 2.

113. The process of Claim 107 additionally comprising a diluent in the gas phase selected from the group consisting of nitrogen, helium, argon, carbon dioxide and water.

114. The process of Claim 113 wherein the mole ratio of alkane to diluent is in the range from 0 to 20.

115. The process of Claim 114 wherein the mole ratio of alkane to diluent is in the range from 0 to 10.

116. The process of Claim 107 wherein the alkane has from two to eight carbon atoms.

117. The process of Claim 116 wherein the alkane is propane or isobutane.

118. The process of Claim 107 wherein the contact occurs at a temperature range from 350 to 550°C.

119. The process of Claim 118 wherein the temperature range is from 425 to 500°C.

120. The process of Claim 107 wherein the contact occurs at a pressure from 1 to 40 psig.

121. The process of Claim 120 wherein the pressure is from 1 to 20 psig.

122. The process of Claim 121 wherein the pressure is atmospheric.

123. The process of Claim 107 wherein the contact time is from 0.01 to 10 seconds.

124. The process of Claim 123 wherein the contact time is from 0.05 to 8 seconds.

125. The process of Claim 124 wherein the contact time is from 0.1 to 5 seconds.

126. The process of Claim 107 wherein the catalyst composition is of the formula:

$$VSb_aM_bM'_{b'}O_x$$

wherein M and M′ are each one element selected from the group consisting of magnesium, aluminum, zirconium, silicon, hafnium, titanium and niobium and b′ is 0 to 50.

127. The process of Claim 107 wherein the catalyst composition is of the formula:

$$VSb_aM_bQ_cO_x$$

wherein Q is at least one element selected from the group consisting of rhenium, tungsten, molybdenum, tantalum, manganese, phosphorus, cerium, tin, boron, scandium, bismuth, gallium, indium, iron, chromium, lanthanum, yttrium, zinc, cobalt, nickel, cadmium, copper, strontium, barium, calcium, silver, potassium, sodium and cesium and c is 0 to 10.

128. The process of Claim 107 wherein the catalyst composition is of the formula:

$$VSb_aM_bQ_cQ'_{c'}O_x$$

wherein Q and Q' are each one element selected from the group consisting of rhenium, tungsten, molybdenum, tantalum, manganese, phosphorus, cerium, tin, boron, scandium, bismuth, gallium, indium, iron, chromium, lanthanum, yttrium, zinc, cobalt, nickel, cadmium, copper, strontium, barium, calcium, silver, potassium, sodium and cesium, c is 0 to 10 and c' is 0 to 10.